Nos. 2015-1950, 2015-1967

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

U.S. WATER SERVICES, INC., ROY JOHNSON,

Plaintiffs - Appellants,

v.

NOVOZYMES A/S, NOVOZYMES NORTH AMERICA, INC.,

Defendants - Cross-Appellants.

Appeal from the United States District Court for the Western District of Wisconsin
Case No. 3:13-cv-00864-jdp, Judge James D. Peterson

NONCONFIDENTIAL PRINCIPAL AND RESPONSE BRIEF OF DEFENDANTS - CROSS-APPELLANTS NOVOZYMES A/S AND NOVOZYMES NORTH AMERICA, INC.

David K. Tellekson
Ewa M. Davison
Phillip K. Decker
Elizabeth B. Hagan
FENWICK & WEST LLP
1191 Second Avenue, 10th Floor
Seattle, WA 98101
(206) 389-4510

Virginia K. DeMarchi
Michael C. Saunders
FENWICK & WEST LLP
Silicon Valley Center
801 California Street
Mountain View, CA 94041
(650) 988-8500

Attorneys for Defendants - Cross-Appellants

December 17, 2015

CERTIFICATE OF INTEREST

Counsel for Defendants - Cross-Appellants Novozymes A/S and Novozymes North America, Inc. certifies the following pursuant to Federal Circuit Rule 47.4:

1. The full name of every party or amicus represented by me is:

   Novozymes A/S, Novozymes North America, Inc.

2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:

   As indicated in item 1.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or amicus curiae represented by me are:

   Novozymes North America, Inc. is a wholly owned subsidiary of Novozymes US, Inc., which is a wholly owned subsidiary of Novozymes A/S. No publicly held company owns 10 percent or more of the stock of Novozymes North America, Inc., Novozymes US, Inc., or Novozymes A/S.

4. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this case are:

Law Firm	Partners and Associates
Fenwick & West LLP	David K. Tellekson, Virginia K. DeMarchi, Brian D. Buckley, Ewa M. Davison, Michael C. Saunders, Phillip K. Decker, Elizabeth B. Hagan, Julia Kolibachuk
Foley & Lardner LLP	Allen A. Arntsen, Krista J. Sterken

December 17, 2015

FENWICK & WEST LLP
1191 Second Avenue, 10th Floor
Seattle, WA 98101
dtellekson@fenwick.com
Ph: 206-389-4510; Fax: 206-389-4511

By: *s/David K. Tellekson*
David K. Tellekson
Attorneys for Defendants - Cross-Appellants

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STATEMENT OF RELATED CASES

Counsel for defendants - cross-appellants Novozymes A/S and Novozymes North America, Inc. ("Novozymes") state the following pursuant to Federal Circuit Rule 47.5:

(a) No other appeal in or from the same civil action in the district court was previously before this Court or any other appellate court.

(b) To the best of counsel's knowledge, there is no case pending in this or any other court that will directly affect or be directly affected by this Court's decision in the pending appeal.

I. JURISDICTIONAL STATEMENT

The district court had jurisdiction pursuant to 28 U.S.C. §§ 1331, 1338(a), 2201(a), and 2202 of the claims and counterclaims filed by the parties in this action. The district court entered an order disposing of all claims and counterclaims on July 29, 2015, and entered an amended final judgment in accordance with its order on August 20, 2015. Plaintiffs-appellants U.S. Water Services, Inc. and Roy Johnson ("U.S. Water") filed a timely notice of appeal on August 24, 2015, and Novozymes filed a timely notice of cross-appeal on August 31, 2015. This Court has exclusive jurisdiction of both U.S. Water's appeal and Novozymes' cross-appeal pursuant to 28 U.S.C. § 1295(a)(1).

II. INTRODUCTION

A claimed feature that is the "natural result" flowing from a prior art method is necessarily and inherently disclosed by the prior art. *King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1275 (Fed. Cir. 2010) (quoting *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981)). Here, U.S. Water's asserted claims are directed to adding phytase to ethanol processing fluid in a method that relies on "the same chemical reaction" taught in the prior art and where the phytase is added "in the same dosages and under the same conditions" as in the prior art. Deposit reduction is merely the natural result of these conditions, which allow phytase to do what it always does—break down phytic acid.

According to U.S. Water, however, the legal standard of inherent anticipation cannot be met as a matter of law when the prior art "can be" practiced in a way that would not "always" result in the allegedly inherent claimed feature. That assertion disregards this Court's holding in *King Pharmaceuticals, Inc. v. Eon Labs, Inc.* that prior art need only meet an inherently disclosed limitation to the extent the patented method does, and no more. 616 F.3d at 1274-76. If what is allegedly missing from the prior art is also missing from the asserted patent, the prior art inherently anticipates regardless of any alleged disputes about unclaimed or undescribed aspects of the invention. Because U.S. Water does not point to any differences between the prior art and the *claimed* conditions for application of phytase, the inherency standard is met, and the district court's invalidity determination should be affirmed.

U.S. Water, the named inventors, and the attorney who prosecuted the asserted patents have long been aware that the inventors' claimed "discovery" that phytase may be used to break down phytic acid, thereby reducing the formation of insoluble deposits in fuel ethanol plant equipment, is not new. During prosecution of its original application, to which the asserted patents claim priority, U.S. Water distinguished its invention from the prior art by explaining to the Patent Office that its method, unlike the prior art, required the addition of phytase only *after* fermentation. But when its first issued patent, limited to adding phytase after fermentation, proved to have no commercial value, U.S. Water pursued broader claims directed to the addition of phytase *at any location* in the ethanol production process. U.S. Water obtained these claims by withholding from the Patent Office admissions made during a then-pending litigation regarding the equivalence of the invention and the prior art, and by withholding from the Patent Office the fact that the asserted claims include subject matter not disclosed in the priority application but instead maintained by U.S. Water as a trade secret. The district court's conclusion that this conduct does not rise to the level of inequitable conduct, as a matter of law, should be reversed.

III. STATEMENT OF THE ISSUES

A. U.S. Water's Appeal

1. Whether the district court correctly granted summary judgment of invalidity under 35 U.S.C. § 102 where U.S. Water admits that the prior art Veit and Antrim references expressly teach each claimed process limitation, and where the remaining "deposit reduction" limitation is the inherent result of the practice of these known process steps.

2. Whether, in the alternative, this Court should affirm the district court's judgment of invalidity under 35 U.S.C. § 112 because the particular combinations of phytase and process conditions that U.S. Water contends are

necessary to achieve the claimed reduction of deposits are neither disclosed nor described in the specification of the asserted patents.

3. Whether, in the alternative, this Court should affirm the district court's judgment of invalidity under 35 U.S.C. § 103 because all claimed limitations in the asserted patents are expressly disclosed by the prior art Caransa reference in combination with Veit or Antrim.

B. Novozymes' Cross-Appeal

1. Whether the district court erred in finding no inequitable conduct as a matter of law, where, viewing the record as a whole in the light most favorable to Novozymes as the non-moving party, genuine issues of material fact exist as to whether individuals associated with the prosecution of the asserted patents withheld material information with specific intent to deceive the Patent Office.

IV. STATEMENT OF THE CASE

According to U.S. Water, the fuel ethanol industry had a mysterious plant equipment fouling problem until U.S. Water employees Paul Young and Roy Johnson discovered that phytic acid forms deposits of insoluble salts in that equipment and invented a method for using phytase to break down phytic acid to reduce such deposits. U.S. Water Br. at 4-5, 9. But U.S. Water does not dispute that all of the steps of its claimed method are expressly taught by the prior art, save for the result of those steps—reducing the formation of insoluble deposits. *See id.*

at 47 (stating that the claims' validity may be determined "solely" by analyzing inherency of deposit reduction); *see also id.* at 4 (statement of the issue); *id.* at 49-52 (failing to dispute prior art's express disclosures). This result, U.S. Water contends, is not inherently disclosed in the prior art because deposit reduction cannot be achieved absent "the right combination of phytase and process conditions." *Id.* at 14-16. No such combinations of phytase and process conditions are claimed in U.S. Water's patents, or even disclosed in the specification that those patents share. The prior art cannot be distinguished from the claimed invention on this ground.

A. The Parties

1. Novozymes

Novozymes is the world leader in the production of enzymes for the fuel ethanol industry. A3153 ¶ 3; A4028-A4029 (No. 18). It has been producing and selling phytases for industrial applications for many years, well before U.S. Water filed for patent protection. A3153 ¶ 4; A4029 (No. 19).

As of February 2000, Novozymes scientists Chris Veit, Claus Felby, Larry Peckous, and Hans Sejr Olsen had developed a method of using phytase during the fermentation step to break down phytic acid, thereby improving the ethanol production process. A1581-A1610. They observed, under experimental conditions intended to mimic those in a fuel ethanol plant, that the addition of phytase effectively eliminated the phytic acid from the processing fluid. A1597:30-A1599:2; A1606; A4455 (No. 294). Mr. Veit and his colleagues filed a patent application on February 23, 2000, describing their discovery. A1581-A1610. The application published on August 30, 2001. A1581.

Novozymes began selling a phytase under the brand name Phytaflow® in May 2013 for use during the fermentation step of the fuel ethanol production process to break down the phytic acid in the processing fluid. A3153 ¶¶ 5-6; A4029-A4030 (Nos. 22-23). Novozymes had been selling a phytase [redacted] since 2007 under the brand name Ronozyme® P-(L) as an additive to break down phytic acid in animal feed, thereby improving the feed's digestibility. A3153 ¶ 4; A4029 (No 20). Novozymes' Ronozyme® phytase is cited in the specification of the asserted patents as among a number of existing, commercially available phytases "suitable" for use in the claimed invention. A138 at 6:1-7.

2. U.S. Water

U.S. Water's primary business is and was water treatment. A3338 (No. 1). In 2007, the year Paul Young and Roy Johnson claim to have made their "surprising" discovery that phytase could be used to reduce phytic acid deposits, U.S. Water had no experience with phytases. Neither Dr. Young nor Mr. Johnson was familiar with the many industrial applications of phytase, including in the fuel ethanol industry, and neither was aware that the magnesium salt of phytic acid was already known to be a foulant in fuel ethanol production plants. A371 (23:4-26:21); A382 (67:3-6); A296-A298 (108:25-115:9). In fact, Dr. Young had never heard of phytase before 2007, and when Mr. Johnson first "looked into it" in mid-to-late 2006, his idea was to use phytase as a coagulant that could aid in the recovery of oil—an idea unrelated (if not antithetical) to deposit reduction and one that did not pan out. A296-A297 (109:23-112:2) (Mr. Johnson explaining his initial theory); A372-A373 (26:22-31:20) (Dr. Young describing non-pursuit of coagulant idea). Together, they "discovered" no more than a previously known application of phytase.

B. The Asserted Patents

U.S. Water is the assignee of three United States patents directed to methods of using the enzyme phytase in an ethanol production process: U.S. Patent Nos. 8,039,244 ("the '244 patent"), 8,415,137 ("the '137 patent"), and 8,609,399 ("the '399 patent"). A144. All three patents claim priority to U.S. Patent Application No. 11/873,630 ("the priority application") filed on October 17, 2007, and share an identical specification. U.S. Water employees Roy Johnson and Paul Young are named as the inventors on all three patents. A135-A141; A144-A150; A1345-A1352.

1. U.S. Water Contends that Novozymes Indirectly Infringes Claims of the ’137 and ’399 Patents

U.S. Water contends that Novozymes indirectly infringes twenty-nine claims of two patents: claims 1, 6, 12, and 13 of the ’137 patent, and claims 1, 2, 5-12, 16-22, 25, 28-32, 34, and 35 of the ’399 patent. A9; A98-99 (Dkt. No. 308).[1] U.S. Water does not assert infringement of the ’244 patent.

Asserted claim 1 is the only independent claim of the ’137 patent, and recites:

> 1. A method of reducing formation of insoluble deposits of phytic acid or salts of phytic acid on surfaces in a fuel ethanol-processing equipment, the method comprising:
>
> adding phytase to an ethanol processing fluid in the equipment containing phytic acid or salts of phytic acid under conditions suitable for converting the insoluble phytic acid or phytic acid salts to soluble products; thereby reducing the formation of deposits of insoluble phytic acid or phytic acid salts on surfaces in the equipment; wherein the equipment in which deposit formation is reduced comprises a beer column, and
>
> wherein the pH of the ethanol processing fluid in the beer column is 4.5 or higher during production of ethanol.

A141. Independent claims 1 and 34 of the ’399 patent are similar to claim 1 of the ’137 patent, except that they omit the pH “4.5 or higher” limitation and instead provide that deposit reduction is accomplished “substantially without the addition

[1] U.S. Water originally asserted infringement of claims 13, 23, 24, and 33 of the ’399 patent, but later dismissed its infringement claims as to those four patent claims. A98 (Dkt. No. 307).

of an acidic compound." A150, A152. Independent claim 25 of the '399 patent additionally requires that phytic acid deposits be reduced in the beer column and that phytase be added to a concentration of 500 ppm or less and 2500 U/L or less.[2] A151-A152. Independent claim 2 of the '399 patent does not include the "substantially without the addition of an acidic compound" limitation found in the other independent claims of the patent, but like independent claim 1 of the '137 patent, it requires that "the pH of the ethanol processing fluid in the beer column is 4.5 or higher" during production of the ethanol. A150-A151.

The asserted dependent claims of both patents add limitations regarding maximum concentrations of the phytase, the temperature range of the fluid in which it is added, the pH range of the fluid in the beer column, and the location where deposits are reduced. *See, e.g.*, A142 ('137 patent claims 12 and 13); A151-A152 ('399 patent claims 6-12, 17-22, and 28-32); A141 ('137 patent claim 6); A152 ('399 patent claim 35); A151 ('399 patent claims 5 and 16).

2. U.S. Water Does Not Dispute the District Court's Characterization of the Claim Limitations

The district court found that the claims asserted by U.S. Water contain seven "common elements" in various combinations, as follows:

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[2] The asserted patents express phytase concentration in two ways: as parts per million or as phytase enzyme activity units per liter. A chart comparing the two unit systems, as well as the unit systems used for phytase concentration employed in Veit and Antrim, is included in the district court opinion. A21.

(1) adding phytase to a fuel ethanol processing fluid containing phytic acid or phytic acid salts;

(2) at a dosage of 10 ppm or less or 50 U/L or less;

(3) at a temperature between 20°C and 80°C;

(4) at a pH of 4.5 or higher in the beer column; and

(5) without the addition of an acidic compound, an oxidizer, an oxidizing agent, or ultraviolet light;

(6) breaking down phytic acid;

(7) thereby reducing the formation of insoluble deposits.

A10. Different claims contain different combinations of the seven elements, and no claims contain all seven elements.[3] U.S. Water does not dispute the district court's characterization of the limitations of the asserted claims.

Having identified the claim limitations at issue, the district court found it necessary to construe only two claim terms, elements (4) and (5). A11-A17. For both, the district court adopted the constructions advocated by U.S. Water. *Id.* On appeal, U.S. Water does not challenge the district court's constructions.

[3] The district court described the dosage element in its narrowest form—i.e., "10 ppm or less" or "50 U/L or less"—however the asserted claims reciting "50 U/L or less" were voluntarily dismissed by U.S. Water after the summary judgment briefing was completed. *See supra* at 8 n.1. The broadest dosage ranges recited in the presently asserted claims are "500 ppm or less" and "2500 U/L or less." A142; A151-A152.

C. U.S. Water's "Invention" Was Already Known in the Prior Art

1. The Specification Acknowledges Key Aspects of the Prior Art

The shared specification of the asserted patents describes much of what was known in the art before the filing of the priority application as of October 2007.

First, the specification recognizes that formation of deposits on ethanol processing equipment was a known problem, and that these deposits were known to be most tenacious where the surfaces of the equipment are hot and where the pH of the processing fluid is high. A136 at 1:32-39. The specification also acknowledges that "standard methods" were known for determining the chemical composition of such deposits. A139 at 8:33-34.

Second, the specification recites that it was well known that phytic acid is released from the plant grains and fibers that constitute the raw material from which ethanol is produced, and thus was known to be present in ethanol processing fluid. A137 at 3:6-7; *see also id.* at 4:11-16.

Third, the specification acknowledges that the ability of phytases to break down phytic acid and convert it into soluble phosphorus was well known in the art, and that phytases had been used in industrial applications for this very purpose, *including in fuel ethanol production before and during fermentation.* A138 at 5:39-50 (referring to use of phytase in the liquefaction and fermentation stages of ethanol processing). The specification also acknowledges that at the time of filing, many phytases were "commercially available" and that several of them would be "suitable" for use in the invention, including Novozymes' own Ronozyme® phytase. *Id.* at 5:51-6:9.

In sum, the inventors conceded in the priority application that deposits were well known to occur in fuel ethanol plants, that conventional methods could be used to determine the chemical composition of those deposits, that phytic acid is present in ethanol processing fluid, that phytase breaks down phytic acid into soluble phosphorus, and that, in fact, phytase already had been used successfully to break down the phytic acid in ethanol processing fluid before and during fermentation.

2. Veit Discloses Adding Phytase to Ethanol Processing Fluids Under the Same Conditions as the Asserted Patents

Novozymes' own work with phytases is key prior art. International WIPO patent application WO 01/62947 was filed by Novozymes on February 23, 2000 (hereafter "Veit"), naming scientist Chris Veit and his colleagues as inventors. The application published on August 30, 2001. A1581-A1610.

Veit discloses that phytase may be added during fermentation to break down phytin—i.e., phytic acid and its salts—in ethanol processing fluids in both wet milling and dry milling ethanol production plants. A1583:33-A1584:4. According to Veit, the "invention relates to an improved fermentation process wherein phytic acid-containing material is fermented in the presence of a phytase, e.g. in fermentation for the production of ethanol." A1581 (Abstract).

Among other things, Veit describes an experiment in which phytase is applied to corn mash under conditions designed to mimic those in the fermentation stage of ethanol production. A1597:30-A1599:2. That experiment used a phytase from *Peniophora lycii*—[redacted] A1593:28-31; A4535-A4536 (No. 408). The data from that experiment shows that the phytase "efficiently hydrolyse[d] the phytin below the detection level." A1598:26-28; A1606. In other words, by breaking down phytic acid and its salts, the phytase reduced the level of these compounds in the ethanol processing fluid to a point where none could be detected. A1597:30-A1599:2; A1606.

U.S. Water has been aware of Veit since well before the asserted patents issued. The specification shared by the asserted patents incorporates by reference U.S. Patent Pub. No. 2005/0272137, a published patent application that is the domestic counterpart of Veit. A147 at 5:54-56. And in 2012, after U.S. Water complained to Novozymes about statements made by its sales personnel concerning U.S. Water's patent rights, Novozymes advised U.S. Water that Novozymes instructed its customers to add phytase in fermentation following "a process described in a patent application filed by Novozymes in 2000 (published in 2001)"—i.e., the method described in Veit. A4024-A4025 (Nos. 12-13); A1925-

A1926; A1928.

As the district court found, Veit discloses:

- adding phytase to fuel ethanol processing fluid containing phytic acid or phytic acid salts;
- a phytase dosage of less than 10 ppm or 50 U/L;[4]
- adding phytase at a temperature between 20°C and 80°C;
- adding phytase at a pH of 4.5 or higher;
- adding phytase without also adding an acidic compound and an oxidizer, or an acidic compound in the presence of ultraviolet light; and
- breaking down phytic acid.

A17-A26. U.S. Water does not dispute these findings on appeal. *See* U.S. Water Br. at 16-19.

3. Antrim Discloses Adding Phytase to Ethanol Processing Fluids Under the Same Conditions as the Asserted Patents

U.S. Patent No. 5,756,714 ("Antrim") issued on May 26, 1998 and claims priority to an application filed on March 9, 1995. A1612-A1623. Antrim teaches that phytase can be used to degrade phytic acid and salts of phytic acid (i.e., "phytates") in ethanol processing fluids. Specifically, Antrim states that phytic acid is known to be present in grain kernels "in the form of phytate salts, such as

[4] Veit discloses a dosage range of 0.0015-75 ppm phytase, or 1.65-82,500 U/L. A3073-A3074 ¶ 97 & Table 1; *see also* A3133. Veit's dosage range is within or substantially similar to the dosage ranges of the asserted claims. A21.

potassium, calcium and magnesium phytate," and that these phytate salts are "responsible for problems associated with low pH liquefaction of starch with α-amylase." A1615 at 3:9-23, 4:37-44. As a solution, Antrim teaches adding "a phytate degrading enzyme," such as a phytase, "to the starch granules or starch solution prior to liquefaction." A1616 at 6:46-49. Antrim further discloses "temperature resistant" phytases capable of breaking down phytic acid in the high-temperature environment of liquefaction. A1617 at 7:62-67.

The district court found that Antrim, like Veit, discloses:

- adding phytase to fuel ethanol processing fluid containing phytic acid or phytic acid salts;
- a phytase dosage of less than 10 ppm or 50 U/L;[5]
- adding phytase at a temperature between 20°C and 80°C;
- adding phytase at a pH of 4.5 or higher;
- adding phytase without also adding an acidic compound and an oxidizer, or an acidic compound in the presence of ultraviolet light; and
- breaking down phytic acid.

A17-A26. U.S. Water does not dispute these findings on appeal. *See* U.S. Water Br. at 19-22.

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[5] Antrim discloses a dosage range of 0.3-272 ppm phytase, or 23-23,100 U/L. A3081-A3082 ¶ 112; A3074 Table 1; *see also* A3133. Antrim's dosage range is within or substantially similar to the dosage ranges of the asserted claims. A21.

D. U.S. Water Sought and Obtained Claims that Cannot Be Distinguished from the Prior Art

During prosecution of the priority application and the two continuation applications that followed, U.S. Water was confronted with extensive prior art concerning phytase use, which included not only Veit and Antrim, but also other prior art that expressly disclosed the use of phytase to reduce deposits in ethanol processing equipment. Given this prior art, the ’137 and ’399 patents should never have issued. As the prosecution history reflects, these patents did issue only because the inventors, prosecuting attorney Mark Skoog, and U.S. Water CEO Allan Bly were not candid with the Patent Office. Instead, they withheld admissions U.S. Water representatives made during litigation against another competitor, ChemTreat, Inc., that were inconsistent with U.S. Water’s statements to the Patent Office and material to the patentability of the inventions now claimed.

1. U.S. Water’s Prosecution of the Priority Application

The ’244 patent, U.S. Water’s first, issued directly from the priority application on October 18, 2011. The claims expressly required that phytase be added *after* fermentation, in a subset of post-fermentation fluids, namely, “thin stillage, backset, or mixture thereof.” A1352-A1353. During prosecution, the inventors and their attorney repeatedly emphasized the location of phytase addition as a point of novelty over the prior art.

For example, the examiner rejected the originally filed claims of the priority application as obvious over Veit, explaining that "Veit et al. teach hydrolysis of phytin (insoluble material comprises phytate) by phytase," and "further teach adding phytase in a fermentation process to ethanol production (reacting insoluble phytate with phytase in the presence of water and alcohol)." A2218-A2220. In response, the applicants on July 29, 2010 amended all independent claims to specify that phytase is added to a subset of post-fermentation fluids, and explicitly distinguished Veit on this basis. A2222-A2225; A2228-A2229.

In a subsequent Office Action, the examiner cited additional prior art, including U.S. Patent No. 4,914,029 ("Caransa"), issued in 1990, against the amended claims, explaining that Caransa specifically teaches that phytic acid forms a "precipitate coating" and that phytase can be used to break down phytic acid to mitigate this problem. A3114-A3119; A2246-A2249. In response, the applicants distinguished Caransa in the same way that they had distinguished Veit, namely based on where phytase is added. A2314-A2316.[6]

[6] Caransa was also cited by the International Searching Authority during prosecution of the foreign counterpart of the priority application. A4046-A4050 (Nos. 42-44); A3224-A3225. In response, U.S. Water explicitly characterized the scope of the invention as limited to the addition of phytase *after* fermentation. A3236-A3237 ("The present *invention* reduces formation of deposits in equipment used post-fermentation by treating process waters located post-fermentation." (emphasis added)); A4050-A4052 (No. 45).

The examiner allowed the ’244 patent to issue with claims directed to adding phytase after fermentation to “thin stillage, backset, or mixture thereof.” A1352-A1353.

2. During its Litigation with ChemTreat, U.S. Water Contradicted its Prior Statements to the Patent Office Distinguishing the Prior Art

Upon issuance, the ’244 patent immediately became the subject of a dispute between U.S. Water and one of its competitors, ChemTreat, Inc. On April 12, 2011, U.S. Water sued ChemTreat in federal court in Minnesota (“the *ChemTreat* litigation”), claiming trade secret misappropriation and tortious interference with contract based on ChemTreat’s sales of a phytase to “aid in the reduction/elimination of phytic acid . . . during fermentation” in fuel ethanol plants. A2866-A2868 ¶¶ 34-46; A3018-A3019. U.S. Water distinguished its trade secrets from the disclosures in its priority application in its complaint against ChemTreat. A2863 ¶¶ 12, 14. Once the application issued as the ’244 patent, ChemTreat counterclaimed for declaratory judgment that it did not infringe the patent and that the patent was invalid. A2900-A2902; A4390-A4391 (No. 205).

On July 2, 2012, ChemTreat moved for summary judgment of non-infringement of the ’244 patent on the ground that the claimed invention was limited to post-fermentation addition of phytase, whereas ChemTreat (like

Novozymes) instructs its customers to add phytase only to fermentation, and therefore did not infringe. A2903-A2906; A2916-A2918.

U.S. Water responded with a *post hoc* strategy to broaden the scope of the patent claims. Relying on the doctrine of equivalents, it argued that adding phytase during fermentation, as ChemTreat instructed, was equivalent to adding phytase after fermentation because the post-fermentation fluid known as "backset" is re-used in ethanol production.[7] According to U.S. Water, there was effectively no difference between directly adding phytase itself to fermentation and adding phytase-containing backset to fermentation. A2927-A2928; A2941-A2942. Prosecuting attorney Mark Skoog submitted a declaration to the Minnesota federal court supporting U.S. Water's litigation argument. A3283-A3285 ¶¶ 11-15.

U.S. Water's "equivalents" argument contradicted the distinctions it had made over the prior art during prosecution. This contradiction was not lost on the federal court in Minnesota. At a hearing on August 17, 2012 attended by U.S. Water CEO Mr. Bly and inventor Mr. Johnson, the court repeatedly confronted U.S. Water's counsel with the observation that the prosecution history appeared to limit the invention to adding phytase *after* fermentation:

[7] In fuel ethanol production, fermentation is preceded by grain processing (via either dry or wet milling) and liquefaction. U.S. Water Br. at 7; A771-A772 ¶ 23; A1031 ¶ 414. Following fermentation, the ethanol is distilled, and any remaining material is separated into two streams. A772-A773 ¶¶ 25-27. A portion of one of those streams, "backset," is recycled back into the ethanol production system at a point just prior to liquefaction. A771-A773 ¶¶ 23, 27.

> It seemed to me that you, I mean unless they've really distorted this prosecution history, that you repeatedly and very clearly kept saying our process isn't about adding phytase at the fermentation stage. We're not the same as adding phytase to the fermentation stage. But now you want to use the doctrine of equivalents to capture exactly that ground that you repeatedly and vociferously gave up in the prosecution.

A2962:13-20; *see also* A2020 (108:6-8); A329 (239:2-16). The court expressed skepticism that addition of phytase during fermentation could infringe the '244 patent claims given how Veit and Caransa had been distinguished:

> So how can you be distinguishing th[e] prior art that the initial rejection was based on, which was using phytase in fermentation? They [ChemTreat] are using phytase in fermentation. So if the prior art is distinguishable, why isn't what they are doing distinguishable? It's the same as what the prior art is.

A2964:7-12. The district court asked for an explanation for the contradictory positions adopted by Attorney Skoog in particular:

> And Mr. Skoog nowhere gives me any hint of an explanation for how the same guy who said the prior art is distinguishable because they're adding the phytase to the fermentation process, . . . can now say oh, ChemTreat, even though they are adding the phytase at the fermentation process, which is exactly what I told the Patent Office is not covered by my patent, now it's covered by my patent. How can he do that?

A2966:16-23.

After the hearing, Attorney Skoog admitted in deposition that he had in fact distinguished both Veit and Caransa during prosecution of the priority application on the basis of where phytase was added. A2973:10-A2974:16; A2980:25-

A2983:24. ChemTreat thereafter renewed its motion for summary judgment of non-infringement. A2989. And this time U.S. Water did not oppose on the merits. A2999. On January 16, 2013, the district court granted ChemTreat summary judgment of non-infringement, finding that "the ['244] patent is clear that it covers only methods that involve adding phytase after fermentation," as further confirmed by the prosecution history. A3000-A3001.

3. U.S. Water Used Continuation Applications to Obtain Broader Claims Without Limitations as to the Location of Phytase Addition

Shortly after ChemTreat filed its initial motion for summary judgment of non-infringement, U.S. Water dramatically changed its patent prosecution strategy. The continuation application that ultimately issued as the '137 patent had been pending for nine months as of that time, with claims limited first to adding phytase "after fermentation" and then, following amendment, to "thin stillage, backset, or mixture thereof." A2474-A2476; A2500-A2502. But on July 20, 2012, just 18 days after ChemTreat filed its motion, the applicants cancelled all pending claims and replaced them with new claims. A2540-A2553. Although the applicants described the new claims as "generally patterned" on claim 1 of the '244 patent, they deleted all limitations regarding the location of phytase addition. The new claims required merely "adding phytase to an ethanol processing fluid in the plant." A2541; A2545. The applicants made no changes to the specification. The

’137 patent issued on April 9, 2013. A134-A135.

The continuation application that issued as the ’399 patent was filed on June 5, 2012, after taking discovery regarding “where ChemTreat’s customers add ChemTreat’s phytase product.” A144; A2901 n.2. The originally filed claims included no limitation regarding the location of phytase addition, A2709-A2714, and no accompanying remarks called that alteration to the examiner’s attention. Instead, the claims provided that phytase could be added “in an ethanol processing fluid in the plant.” *Id.* The ’399 patent issued on December 17, 2013. A144.

The following table compares where the prior art discloses adding phytase in the fuel ethanol production process with where the asserted patents, by U.S. Water’s own account, claim phytase addition:

	Liquefaction	**Fermentation**	**Post-Fermentation**
Veit		✓	
Antrim	✓		
’244 patent			✓
Asserted patents	✓	✓	✓

At no time did the inventors, patent prosecution attorney (and litigation declarant) Dr. Skoog, Mr. Bly,[8] or anyone else associated with the prosecution of

[8] Mr. Bly was one of the people responsible for decisions regarding U.S. Water’s patent strategy and was involved in the prosecution of the asserted patents. A3985

the ’137 and ’399 patents disclose to the Patent Office the existence of the *ChemTreat* litigation or any documents from the *ChemTreat* litigation that would have made clear U.S. Water’s changed position regarding the scope of the prior art as compared to the scope of its claims.[9]

E. U.S. Water Obtained Claims Encompassing Trade Secrets Not Disclosed in the Priority Application

In addition to removing from the pending continuation claims any limitation regarding the location of phytase addition, the applicants also introduced a limitation specifying that “the pH of the ethanol processing fluid in the beer column is 4.5 or higher.” A2545. They also added a limitation specifying that reduction of phytic acid deposits is accomplished “substantially without the addition of an acid.” A2541; A2545; A2709-A2710. These limitations are related. Acid addition reduces the pH of ethanol processing fluid; conversely, reducing the use of acid elevates the pH of the fluid. A775-A776 ¶ 34; A900 ¶ 80; A3139-A3140 ¶¶ 9-10; A3457-A3458 (No. 294). The asserted claims of the ’137 and ’399 patents contain one or the other of these limitations.

(314:3-11); A3333-A3336 (Entry Nos. 22, 24, 25, 28, 32, 33, 38, 47, 50, and 52); A3291-A3329 (Entry Nos. 69, 119, 126, 142, 143, 194, 195, 200-202, 212, 215-217, 226, 231, 242, 243, 256, 258, 264, 266, 267, 274, 301-303, 351, 352, 436, 437, 445, 449, 461, 462, 509, 532, 539, 544, 547, 563, 565, 599, 606, 610, 613, 617, 618, 649, 652, 668, 670-672, 674-677).

[9] During the pendency of this case, after Novozymes deposed Attorney Skoog about prosecution of the asserted patents, U.S. Water withdrew an allowed application in the same family from issuance. A574 ¶ 87; A1946 ¶ 87; A1923; A1888 (191:25-192:8).

During the *ChemTreat* litigation, U.S. Water identified being able to use phytase to limit the amount of sulfuric acid used during ethanol processing as one of several trade secrets that had been misappropriated by ChemTreat, and it made clear that these trade secrets were not disclosed in the priority application. Mr. Johnson, in a declaration submitted on March 30, 2012 in the *ChemTreat* litigation, affirmed that admission specifically as to the trade secret relating to reducing acid feed, stating that ChemTreat's advertising claim that phytase is "more effective than acid feed" (a claim U.S. Water alleged was a misappropriation of its trade secret) "is not taught nor mentioned in the patent filing." A3015 ¶ 13; A2863 ¶ 14.

No one associated with the prosecution of the applications that issued as the '137 and '399 patents disclosed to the Patent Office that U.S. Water had taken the position during the *ChemTreat* litigation that the subject matter of the claims included trade secrets not disclosed in the priority application.

F. The District Court Proceedings

U.S. Water sued Novozymes for infringement of the '137 patent on December 17, 2013, and of the '399 patent on February 20, 2014. A229-A230 ¶¶ 25-32; A158-A160 ¶¶ 27-42. Novozymes counterclaimed for declaratory judgment of non-infringement and invalidity of both the '137 and '399 patents, and for a finding that both patents are unenforceable due to inequitable conduct. A554-A578 ¶¶ 10-97.

Both parties moved for summary judgment on multiple issues on January 16, 2015. Novozymes asserted that it was entitled to summary judgment that the asserted claims are invalid because they are anticipated by Veit and Antrim under 35 U.S.C. § 102, obvious in light of Veit or Antrim in view of Caransa under § 103, and lack written description and enablement under § 112. U.S. Water asserted that it was entitled to summary judgment that no one associated with prosecution of the asserted patents had committed inequitable conduct. On July 29, 2015, the district court issued a case-dispositive opinion finding the asserted claims of the ’137 and ’399 patents invalid because they were anticipated by Veit and Antrim. A9-A32; *see also U.S. Water Servs., Inc. v. Novozymes A/S*, __ F. Supp. 3d __, No. 13-cv-864-jdp, 2015 WL 4634352 (W.D. Wis. July 29, 2015). The district court also granted summary judgment of no inequitable conduct in favor of U.S. Water. A33-A36. The district court denied summary judgment on all other issues raised by the parties as moot. A36-A37.

V. SUMMARY OF THE ARGUMENT

The district court’s order granting summary judgment of invalidity should be affirmed. Both the asserted patents and the prior art “teach using phytase during ethanol production, in the same dosages and under the same conditions, to perform the same chemical reaction,” and the sole remaining limitation of “deposit reduction is a *natural result* of the[se] methods for adding phytase during ethanol production." A27-A28 (emphasis added). The district court correctly concluded that Veit and Antrim expressly disclose all but one of the limitations of the asserted claims and inherently disclose the remaining limitation, observing: "[W]hat matters is whether the prior art discloses the conditions that will *necessarily* result in phytase reducing deposits. And on that issue, there is no genuine dispute." A29 (emphasis added). The district court did not err, either legally or factually, in holding the asserted claims invalid as anticipated under 35 U.S.C. § 102.

U.S. Water does not challenge the district court's finding that all of the steps of its claimed methods, except for reducing deposit formation, are expressly disclosed by the prior art. Nor is there any dispute that reduced deposit formation is the *result* of the remaining (expressly disclosed) steps of U.S. Water's claimed methods. At best, therefore, the invention claimed by U.S. Water is the newly discovered result of a known process, and as such is unpatentable under long-established principles of inherent anticipation.

U.S. Water argues that the prior art cannot anticipate because it fails to disclose the "sophisticated recipe" of phytase and process conditions developed by U.S. Water. But U.S. Water did not claim (or disclose) any "recipe" other than the parameters already disclosed by the prior art, and thus cannot now distinguish that prior art on the basis of unclaimed limitations. Nor can U.S. Water have it both ways; if U.S. Water's arguments regarding the importance of undisclosed parameters to reducing deposit formation are credited, then the asserted patents fail to satisfy the written description and enablement requirements of 35 U.S.C. § 112. And as the use of phytase to reduce deposit formation is expressly disclosed in additional prior art, summary judgment of invalidity can also be affirmed on the alternative basis of obviousness under 35 U.S.C. § 103.

The district court did err, however, in granting summary judgment of no inequitable conduct. It faulted Novozymes, the non-movant, for not establishing that U.S. Water's failure to disclose the *ChemTreat* litigation to the Patent Office was material and that those associated with prosecution of the asserted patents had a specific intent to deceive. A33-A36. But it was not Novozymes' burden in opposing summary judgment to prove that it was entitled to judgment as a matter of law in its favor; rather, Novozymes had the burden to prove that at least a genuine issue of material fact *precluded* judgment in U.S. Water's favor. Novozymes met that burden. In concluding otherwise, the district court not only held Novozymes to an incorrect standard, but also failed to consider all of the evidence of inequitable conduct in the summary judgment record, including admissions made and positions taken by the inventors, U.S. Water, and the prosecuting attorney during the *ChemTreat* litigation that contradicted positions taken during prosecution of the asserted patents before the Patent Office.

VI. ARGUMENT

A. Standard of Review

This Court reviews the district court's grant of summary judgment *de novo*. *Taurus IP, LLC v. DaimlerChrysler Corp.*, 726 F.3d 1306, 1322 (Fed. Cir. 2013); *Merry Gentleman, LLC v. George & Leona Prods., Inc.*, 799 F.3d 827, 829 (7th Cir. 2015). Summary judgment should be affirmed "when, drawing all justifiable inferences in the non-movant's favor, there exists no genuine issue of material fact and the movant is entitled to judgment as a matter of law." *King Pharm.*, 616 F.3d at 1273 (citing Fed. R. Civ. P. 56(c); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 252, 255 (1986)); *accord Pugh v. City of Attica*, 259 F.3d 619, 625 (7th Cir. 2001).

Anticipation is a question of fact, but is frequently amenable to summary judgment. *Taurus IP*, 726 F.3d at 1324-25 (affirming summary judgment of anticipation because "[a]lthough anticipation is a question of fact, a district court may, on summary judgment, invalidate a patent claim as anticipated by a prior art reference if the patentee does not identify a genuine issue of material fact"); *see also, e.g.*, *Ineos USA LLC v. Berry Plastics Corp.*, 783 F.3d 865, 869-72 (Fed. Cir. 2015) (affirming summary judgment of anticipation where patent owner failed to raise any genuine disputes of material fact).

Inequitable conduct is a question for the district court to decide in its equitable jurisdiction, with intent and materiality as underlying questions of fact.

Am. Calcar, Inc. v. Am. Honda Motor Co., 651 F.3d 1318, 1333-34 (Fed. Cir. 2011). While inequitable conduct is likewise amenable to summary judgment, the district court may not pre-determine on summary judgment a question that it should decide on the merits with the benefit of an evidentiary hearing. *See Leviton Mfg. Co. v. Universal Sec. Instruments, Inc.*, 606 F.3d 1353, 1363 (Fed. Cir. 2010).

B. The District Court Properly Granted Summary Judgment of Anticipation

U.S. Water's principal argument on appeal is that the district court could not, as a matter of law, find the asserted claims anticipated because the court acknowledged that U.S. Water had presented evidence that the teachings of the prior art "will not *always* result in deposit reduction." U.S. Water Br. at 35 (quoting A28). This is not a fair reading of the district court's opinion. Summary judgment is not precluded merely because the non-moving party introduces some evidence in support of its position; rather, that evidence must establish the existence of a genuine issue of material fact. Here, the district court concluded U.S. Water did not make that showing. A28-A29. Rather, the district court found that because Veit and Antrim indisputably disclose *all* of the *claimed* steps and process conditions necessary to achieve the result of deposit reduction, that reduction was inherent in the prior art. *Id.*

1. The District Court Correctly Concluded that Veit and Antrim Anticipate the Asserted Claims

"To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently." *MEHL/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999). If the prior art "necessarily functions in accordance with, or includes" a limitation, the limitation is inherent in the prior art reference. *Id.* While inherent anticipation may not be established by "probabilities or possibilities," if the prior art's disclosure is sufficient to show that "the *natural result* flowing from the operation as taught would result in the performance of the questioned function," the prior art disclosure should be regarded as sufficient to anticipate. *King Pharm.*, 616 F.3d at 1275 (emphasis added) (quoting *In re Oelrich*, 666 F.2d at 581).

U.S. Water does not challenge the district court's finding that all of the steps of its claimed methods, save the result, are expressly disclosed in the prior art, and there is no genuine dispute that the claimed result—a reduction of phytic acid deposits—is merely the inherent result of those steps. The district court determined that Veit, Antrim, and the asserted patents all disclose "the same chemical process" through which phytase breaks down phytic acid so that it cannot form insoluble deposits, and further that they all "teach using phytase during ethanol production, *in the same dosages and under the same conditions*, to perform *the same chemical reaction*." A27-A28 (emphases added). Given those findings, the district court concluded that deposit reduction is "a *natural result* of the methods for adding phytase during ethanol production that Veit and Antrim disclose." A27 (emphasis added).

The specification of the asserted patents makes clear that deposit reduction is merely the natural result of breaking down phytic acid in ethanol processing fluid by adding phytase. A137 at 3:12-17 ("The present invention relates to converting insoluble phytic acid salts (i.e., phytate) to soluble inorganic phosphates . . . which can improve metal solubility and reduce deposition within processing equipment."); *id.* at 3:55-58 ("[I]n an aspect, the method of the present invention provides for reducing or removing phytate that can deposit on ethanol processing equipment."); A139 at 7:51-54 ("In an embodiment, the present invention provides a method in which the agent added to the ethanol processing fluid converts soluble phytate, phytate suspension, phytate precipitate, or phytate scale into soluble orthophosphate."). Indeed, the language of the asserted claims also reflects that deposit reduction is the natural result of adding phytase. *See, e.g.*, A141 ('137 patent, claim 1: "adding phytase to an ethanol processing fluid . . . containing phytic acid or salts of phytic acid under conditions suitable for converting the insoluble phytic acid or phytic acid salts to soluble products; *thereby reducing* the formation of deposits of insoluble phytic acid or phytic acid salts on surfaces in the equipment" (emphasis added)); A150 ('399 patent, claim 1: "wherein providing the additive comprising phytase in the ethanol processing fluid *causes a reduction* of the formation of insoluble deposits of phytic acid and/or salts of phytic acid" (emphasis added)).

Conversely, nothing in the specification of the asserted patents suggests that only particular combinations of phytases and process conditions will produce this result. One of the inventors, Mr. Johnson, conceded during his deposition that the addition of phytase to ethanol processing fluid under the parameters of temperature, pH, concentration, and residence time recited in the asserted patents *will* result in a reduction in the formation of deposits. A3980 (292:23-293:6).

The district court noted that U.S. Water "does not genuinely dispute" the testimony of Novozymes' expert Dr. Scott Kohl that "[i]n all of its uses, including all of its industrial uses, phytase breaks down phytic acid or salts of phytic acid by the same mechanism of action." A27 (quoting A3044 ¶ 23); *id.* n.10 (discussing U.S. Water's response to Novozymes' Proposed Finding No. 28, A3636-A3637). The district court also considered the testimony of Dr. George Reed, an expert witness for U.S. Water, who opined that all phytases "catalyze hydrolysis of phosphomonoester bonds of phytic acid." A27 (quoting A752 ¶ 14). In particular, the court observed that while Dr. Reed explained that certain variables can affect phytase activity, his analysis "does not suggest that *all* phytase activity would stop if the variables are outside optimal ranges."[10] A27-A28. The claims require no particular quantum of either activity or reduction of deposits. Accordingly, the district court correctly determined that there is no genuine dispute as to whether "the prior art discloses the conditions that will necessarily result in phytase reducing deposits," A29, as the parties' experts agree that phytase *will* degrade phytic acid under the process conditions disclosed by Veit, Antrim, and the asserted patents, and as a result, fewer deposits of phytic acid salts will form.

Deposit reduction is merely a beneficial result of reaction conditions in which a phytase suitable for ethanol processing does what it always does: it breaks down the phytic acid that causes deposits to form. The same beneficial result of reducing the formation of deposits is inherent in Veit's and Antrim's disclosures of breaking down the phytic acid that produces the deposits, even if those prior art references do not expressly recognize that benefit. *See King Pharm.*, 616 F.3d at 1275 ("newly discovered benefits are not patentable because they are inherent in the prior art"). By failing to contest the district court's characterization of the elements common to its claimed methods or the court's finding that all of those elements, save for that result, are expressly disclosed in the prior art, U.S. Water effectively concedes that its claims require *nothing else* to achieve that result. U.S.

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[10] On appeal, U.S. Water does not dispute the district court's characterization of Dr. Reed's opinion.

Water cannot point to any claim limitation that distinguishes the prior art processes from the asserted claims.

2. U.S. Water Cannot Distinguish the Prior Art Based on Unclaimed Features of the Alleged Invention

U.S. Water attempts to distinguish the prior art on the ground that it provides insufficient guidance regarding how to achieve deposit reduction, arguing that its own invention is a "sophisticated recipe" requiring careful selection of suitable phytases and optimization of several process parameters. But this so-called recipe is not *claimed*. U.S. Water cannot distinguish the prior art on the basis of unclaimed features, as the prior art need only disclose the *claimed* limitations to the same extent as the asserted claims of the patents.

Because inherency is established if "the natural result flowing from the operation as taught would result in the performance of the questioned function," *MEHL*, 192 F.3d at 1365 (quoting *In re Oelrich*, 666 F.2d at 581), "the prior art need only meet the inherently disclosed limitation *to the extent the patented method does*." *King Pharm.,* 616 F.3d at 1276 (emphasis added); *see also MEHL*, 192 F.3d at 1366 (finding claims anticipated because "to the extent the embodiment in the patent achieves [the limitation], so does the [prior art] method"). Reliance on unclaimed distinctions to distinguish the claimed invention from the prior art is "inappropriate" and "insufficient to save the claim from inherent anticipation." *King Pharm.*, 616 F.3d at 1275 (citing *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 632 (Fed. Cir. 1987)).

King Pharmaceuticals, Inc. v. Eon Labs, Inc. was cited by the district court below and is directly on point, yet nowhere addressed by U.S. Water in its brief. A9, A26. In *King*, the asserted claims were directed to "a method of increasing the oral bioavailability" of the muscle relaxant metaxalone by administering the drug "with food." 616 F.3d at 1270-71. The defendant asserted that these claims were inherently anticipated by prior art that expressly disclosed taking metaxalone "with food," even though the prior art did not discuss the improved bioavailability of the drug that resulted. *Id.* at 1272. The district court agreed and held the claims invalid. *Id.* at 1272-73.

On appeal, the patentee argued that it was improper for the district court to "assume" that an increase in bioavailability was necessarily achieved by taking metaxalone with food as taught by the prior art, relying on expert opinions that "specific food conditions" would be required to achieve the claimed increase in bioavailability. *Id.* at 1274-75. This Court rejected the patentee's argument, explaining:

> As taught by the [asserted] patent, the only steps required to increase metaxalone's bioavailability are (1) ingesting metaxalone (2) with food. These steps are undeniably disclosed by the prior art. An increase in metaxalone's bioavailability is, therefore, an inherent aspect of the prior art. In other words, the increase in metaxalone's

> bioavailability is the "'natural result' flowing from the [prior art's] explicitly explicated limitations."

Id. at 1276 (quoting *Eli Lilly & Co. v. Barr Labs., Inc.*, 251 F.3d 955, 970 (Fed. Cir. 2001)). The Court continued:

> [The patentee's] experts' opinions that "even a disclosure of taking metaxalone with food would not inherently disclose increasing the bioavailability of metaxalone," do not undermine our analysis. To anticipate, the prior art need only meet the inherently disclosed limitation to the extent the patented method does. Because the [asserted] patent discloses no more than taking metaxalone with food, to the extent such a method increases the bioavailability of metaxalone, the identical prior art method does as well. As the district court aptly stated, "to inherently anticipate, the prior art need only give the same results as the patent, not better."

Id. (internal citations omitted).

Here, U.S. Water attempts precisely what *King* prohibits. It applies fictional limitations that are nowhere recited in any claims, or even disclosed in the specification, to distinguish the prior art. On appeal, U.S. Water refers to the invention as a "sophisticated recipe of phytase amounts, conditions, concentrations, and parameters of use." U.S. Water Br. at 10; *see also, e.g.*, *id.* at 15 ("the right combination of phytase and process conditions"); *id.* at 16 ("the correct 'recipe'"). According to U.S. Water, "if the right type and amount of phytase is not used and process conditions are not correct, fouling reduction *will not occur*." *Id.* at 15. U.S. Water, however, has not claimed any specific "recipe" for reducing deposit reduction. It has claimed only the seven elements identified by the district court. The prior art discloses those same elements to the same extent as the asserted patents.

For example, U.S. Water argues that Veit provides no guidance regarding "what phytases to use." *Id.* at 18. This is not an accurate characterization of Veit, which discloses several phytases suitable for adding to processing fluid during fermentation. A1589:21-A1590:25; A1593:30-31. However, *none* of the asserted claims requires that a specific phytase be used to achieve the claimed "reduction of the formation of insoluble deposits." A141-A142; A150-A152. Nor does the shared specification of the asserted patents disclose how to avoid phytases that will not work in deposit reduction.[11] *See* A138 at 5:51-6:9. And with good reason. As inventor Paul Young admitted during his deposition, he would not have been able to limit the claims to particular phytases even if he had wanted to because he "[didn't] know which is which." A381 (62:5-9). Instead, the specification refers to a wide array of existing phytases that are "suitable" for use in the invention, without limitation. A147 at 6:1-9.

The asserted patents also give no specific guidance for any of the other process conditions that U.S. Water describes as critical to reduced deposit formation. As to temperature, only one asserted claim recites a temperature range

[11] The sole passage in the specification that discusses selection of suitable phytases incorporates Novozymes' Veit application by reference. A138 at 5:51-6:9 (citing U.S. Pat. Pub. No. 20050272137); A3121-A3131.

limitation, and that claimed range is broader than the temperature range disclosed in the prior art. *Compare* A141 (claim 6) *with* A1589:4-7 (Veit) *and* A1617 at 7:57-62 (Antrim). As to "reaction time" or "residence time" for the phytases in the fluid, *none* of U.S. Water's claims recite such a limitation despite U.S. Water's argument on appeal that deposit reduction depends at least partially on this factor. U.S. Water Br. at 10. As to pH, while a subset of the asserted claims requires a pH of 4.5 or higher "at some point" in the beer column, U.S. Water does not dispute the district court's finding that this parameter is irrelevant to reduced deposit formation, *see* A13 ("the pH does not need to be above 4.5 for the claimed invention to successfully reduce deposits"), or that it is disclosed in both Veit and Antrim. Finally, as to dosage, the district court found that U.S. Water conceded that the prior art discloses dosages that fall within the ranges claimed by the asserted patents; again, U.S. Water does not challenge this finding. A21-A22.

To the extent U.S. Water contends that "choices" of phytase, dosage, addition point, residence time, pH, and temperature must be "coordinated" to achieve deposit reduction, U.S. Water. Br. at 16, the specification discloses no such "coordination" of the factors that supposedly distinguish the invention from the prior art, and no such coordination is actually claimed.[12]

[12] U.S. Water's attempts to analogize the prior art to "the ingredients in a Betty Crocker cake box without [a] recipe" and "monkeys [writing] *Hamlet*" miss the point. *See* U.S. Water Br. at 19, 24. U.S. Water provides no "recipe" that is not

U.S. Water's reliance on an unspecified and unclaimed "recipe" of "phytase and process conditions" is, as for the patentee in *King*, insufficient to save the asserted claims from inherent anticipation.

3. U.S. Water Cannot Rely on a 98% Phytic Acid Conversion Requirement to Distinguish the Prior Art

U.S. Water's argument that the district court improperly ignored evidence that practicing the prior art will not always result in deposit reduction hinges on its assertion that deposit reduction is governed by "zero order" kinetics, and thus will only "switch on" if phytase "convert[s] at least 98% of all the phytic acid flowing through the plant." *See* U.S. Water Br. at 14-16, 42-43, 49-52. But the asserted patents neither claim nor disclose a minimum amount of phytic acid that must be degraded or a minimum amount by which deposit formation must be reduced. *See* A141-A142, A150-A152. They require nothing more than "breaking down phytic acid" and "thereby reducing the formation of insoluble deposits." A10. For this reason, whether zero order kinetics apply to deposit reduction is not legally relevant.

U.S. Water cannot avoid anticipation by arguing for narrower claims on appeal. U.S. Water never asked the district court to construe the asserted claims in

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also found in the prior art. As for *Hamlet*, the monkey analogy is not helpful because *how* the story came to be written is irrelevant; what matters is that the exact words and plot of the story are already in the prior art. The law of inherent anticipation prevents patentees from claiming authorship over a known story when all they have provided is a new title.

the manner it now advocates—i.e., requiring breaking down "at least 98%" of the phytic acid in the processing fluid, and reducing the formation of deposits by some still-unspecified minimum amount. U.S. Water's contention that the district court erred in granting summary judgment because the prior art might not "always" degrade 98% of the phytic acid in ethanol processing fluid is thus not only improper under *King* for the reasons explained above, but also an impermissible attack on the meaning of claim language U.S. Water never sought to have construed below.[13] *See Regents of Univ. of Minn. v. AGA Med. Corp.*, 717 F.3d 929, 946 (Fed. Cir. 2013) (in affirming summary judgment of anticipation, observing that the patentee "styles its arguments as challenges to the district court's application of this claim construction, but they are essentially indirect objections to the claim construction itself, which the [patentee] did not raise to the district court").

The district court determined that there is no genuine dispute that phytase in all its uses breaks down phytic acid, and that deposit reduction is a natural result of breaking down phytic acid. A27-A28. U.S. Water's contrary contention that deposit reduction requires degradation of 98% of the phytic acid in ethanol processing fluid relies solely on the opinion of its expert Eric Dorn. Yet Mr. Dorn admits that his analysis "is not intuitively obvious" and is "somewhat difficult to understand," and in fact *contradicts* the understanding of plant fouling kinetics possessed by a person of skill in the art. A854-A855 ¶¶ 51-52. Mr. Dorn's sole support for the applicability of zero order kinetics is a single cursory statement that he has personally observed this phenomenon and that others have described it to him.[14] A854 ¶ 50. Nowhere does Mr. Dorn demonstrate that phytic acid deposits actually behave in the way he contends, and indeed, following the completion of summary judgment briefing, Mr. Dorn conceded in deposition that the purported requirement of 98% phytic acid conversion is merely a "theory or a thought" he proffers to explain anecdotal evidence. A4867-A4868 (236:9-237:12); A4867 (233:24-235:4). Such evidence cannot create a genuine dispute of material fact. *See Bradley v. Brown*, 42 F.3d 434, 438 (7th Cir. 1994) (affirming exclusion of expert testimony where the experts' explanations were "at best, hypothetical at this point" and their method "merely anecdotal"); *cf. MEHL*, 192 F.3d at 1367 ("expert testimony contradicting the plain language of the reference does not create a genuine issue of fact").

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[13] Even if the claims required a particular amount of phytic acid conversion, Veit teaches that "[t]he phytase efficiently hydrolyses the phytin *below detection level*." A1598:27-28 (emphasis added). Antrim similarly teaches phytase treatment "so as to *eliminate* the enzyme inhibiting characteristic [of the phytates in the processing fluid]." A1616 at 6:41-46 (emphasis added).

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[14] Mr. Dorn otherwise *assumes* the existence of "zero order kinetics" in his opinion and proposes two hypotheses for why it might occur. A850-A853 ¶¶ 40-49 (describing "mass transfer" hypothesis); A855-A860 ¶¶ 53-63 (describing "insoluble sink" hypothesis).

Given that the claims do not require a minimum amount of phytic acid degraded or deposits not formed, and that U.S. Water's kinetics-based argument is no more than an unsubstantiated theory, the district court correctly concluded that "the evidence of record establishes that deposit reduction is a natural result of the methods for adding phytase during ethanol production that Veit and Antrim disclose." A27. In making that determination, the court relied on evidence presented not only by Novozymes *but also by U.S. Water* that Veit, Antrim, and the asserted patents all "disclose the same chemical process through which phytase breaks down phytic acid." *Id.*

4. The Evidence of Record Shows that the Accused Customers Practice Veit and/or Antrim and Achieve Deposit Reduction

U.S. Water is not correct that "there is no evidence on this record that any person at any time ever practiced Veit or Antrim and achieved deposit reduction." U.S. Water Br. at 29-30 n.8; *id.* at 27 n.7.

The evidence is undisputed that the plants accused by U.S. Water of direct infringement practice what Veit teaches. U.S. Water contends that each of the plants accused of directly infringing the asserted patents applied Novozymes' Phytaflow® phytase during the fermentation stage, as taught by Veit. *Compare* A1589:4-7 (Veit) *with* A784-A815 ¶¶ 54, 67, 80, 92, 104, 113, 122, 132. Novozymes' Phytaflow® [redacted] *Compare* A1590:5-19 *and* A1593:30-31 (Veit) *with* A4535-

A4536 (No. 408). The pH of the fermentation process at each of the accused plants is consistent with the pH range disclosed by Veit. *Compare* A1585:5-9 (Veit) (disclosing a fermentation pH range from 3 to 6) *with* A786-A816 ¶¶ 58, 70, 85, 95, 107, 116, 127, 134. The fermentation processes at each plant occurred at temperatures consistent with those disclosed by Veit. *Compare* A1585:4-9 (Veit) (disclosing fermentation temperature of 26-34°C) *with* A944 ¶ 184 (opining that "fermenters routinely operate below 40°C"). Finally, each of the accused plants applied Phytaflow® within the dosage range taught by the method disclosed in the Veit reference. A4488-A4489 (No. 336) (disputing reference values used in calculations, but leaving undisputed the conclusion that the accused plants dosed phytase within the range taught by Veit); *see also* A4458-A4460 (No. 300). As the district court found, Antrim similarly teaches all of these same conditions and process steps. *See* A17-A26.

By failing to make any meaningful distinction between Veit's method and the actions taken by the accused plants, U.S. Water effectively admits inherency by accusing the named plants of infringement.[15] Indeed, U.S. Water has not argued that any plant was using Novozymes' phytase product in a manner that fell within the conditions required by the asserted claims but fell outside of any of the suggested process parameters disclosed in Veit, and yet U.S. Water accuses each of achieving the claimed deposit reduction. U.S. Water offers no empirical evidence that any accused plant fails to reduce deposits. It is simply not credible for U.S. Water to contend on appeal that there is "no evidence" practicing Veit and Antrim results in reduced formation of phytic acid deposits.

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[15] In fact, U.S. Water alleges that the mere sale of Phytaflow® constitutes *contributory* infringement under 35 U.S.C. § 271(c). A160 ¶ 39; A1681-A1683. Because § 271(c) requires that there be no "substantial noninfringing use" of the material sold by the accused indirect infringer, that contributory infringement allegation serves effectively as an admission that *any* use of Novozymes' product by fuel ethanol plants would meet the deposit reduction limitation of the asserted claims.

5. The District Court Made No Other Errors of Fact or Law that Warrant Reversal of Summary Judgment of Invalidity

U.S. Water argues that the district court simply overlooked the fact that deposit reduction is an express limitation of the claims because it referred to deposit reduction as a "goal." U.S. Water Br. at 36. Not so. The district court identified "reducing the formation of insoluble deposits" as one of the seven common elements, and thus an express limitation, of U.S. Water's asserted claims, A10, and would not otherwise have considered whether deposit reduction is inherently disclosed by the prior art. But since Dr. Young distinguished Veit and Antrim on the basis that deposit reduction was not their "goal," A28 (citing A1957 (306:2-6)), the district court correctly concluded, following this Court's decision in *MEHL*, that such a distinction is irrelevant to the question of inherent anticipation. *See* 192 F.3d at 1366 (in affirming summary judgment of anticipation, finding that a prior art reference's "failure" to mention the asserted claims' goal of hair depilation was "irrelevant"). Whether characterized as an express limitation, a result, or a goal, the district court correctly concluded that reduced deposit formation *is* inherently disclosed by the prior art. *See, e.g.*, A26, A31.

Although U.S. Water does not dispute the district court's finding that Veit and Antrim disclose all of the limitations of the asserted claims, except for the result of reducing formation of deposits, it complains that the district court did not consider how the ranges of process conditions (e.g., temperature, pH, dosage) disclosed in the prior art impact the question of inherent anticipation, and that the district court simply "bypassed the required, careful inquiry into inevitability." U.S. Water Br. at 37-45 (relying on *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342 (Fed. Cir. 1999) and *Perricone v. Medicis Pharmaceutical Corp.*, 432 F.3d 1368 (Fed. Cir. 2005)). The district court did not "bypass" the question of inherency. To the contrary, after finding that the limitations expressed as ranges in the asserted patents were also expressly disclosed by Veit and Antrim, the district court proceeded to separately and independently consider whether the sole remaining limitation of reduced deposit formation is inherently disclosed by the prior art. A26-A32. In particular, the district court concluded, and U.S. Water does not dispute, that Veit and Antrim disclose the same phytase dosages and the same process conditions as the asserted claims, and that these necessarily produce "the same chemical reaction" as in the asserted claims. A28.

In these circumstances, Novozymes need not demonstrate that deposit reduction will occur across *all* possible combinations of phytases and process conditions disclosed in the prior art. Rather, Novozymes need only show that the prior art discloses phytases and process conditions that necessarily result in the reduction of deposits to the same extent as the asserted patent. *King Pharm.*, 616 F.3d at 1276. U.S. Water does not dispute that the embodiments disclosed in Veit and Antrim are well within the process parameters claimed in the asserted patents. A18-A22; U.S. Water Br. at 16-22 (not identifying any issues of material fact regarding the prior art's express disclosures); *id.* at 49-52 (same). U.S. Water has never shown, below or in its briefing on appeal, that any particular range of process conditions is "critical to the operability of the invention," and has therefore waived any such challenge on appeal. *See Ineos*, 783 F.3d at 869 (affirming summary judgment of anticipation because patentee "failed to raise a genuine question of fact about whether the range claimed is critical to the operability of the invention"); *Perricone*, 432 F.3d at 1378 ("If [the prior art] discloses the very same methods, then the particular benefits must naturally flow from those methods even if not recognized as benefits at the time of [the prior art's] disclosure.").

Glaxo Inc. v. Novopharm Ltd., 52 F.3d 1043 (Fed. Cir. 1995), on which U.S. Water relies, does not compel a different conclusion. *Glaxo* is best understood as a case in which the evidence was simply insufficient to prove that the disclosed prior art method certainly and necessarily produced the claimed composition. The district court found at trial that the method sometimes yielded the composition and sometimes did not, and this Court was not persuaded that these factual findings were clearly erroneous. *Id.* at 1047-48. The limited discussion of inherent anticipation in *Glaxo* does not address the circumstances presented by this case, where the prior art methods of Veit and Antrim are identical to the claimed methods, save for failing to expressly disclose the beneficial result of those methods.

Finally, the district court did not rely on "practicing the prior art" as a basis for finding the asserted claims invalid, as U.S. Water contends. U.S. Water Br. at 45-49. Rather, the district court made the simple point that because Veit and Antrim teach using the same enzyme at "the same dosages" and under "the same conditions" to perform "the same chemical reaction" as in the asserted claims, permitting U.S. Water to patent the exact same process would remove it from the public domain where it has now existed for over a decade. A28, A31-A32 ("The patents-in-suit, if valid, would prevent the public from practicing Veit and Antrim."). The district court's observation has nothing to do with a "practicing the prior art" defense to *infringement*, but rather takes note of the role of the inherent anticipation doctrine to ensure that "[t]he public remains free to make, use, or sell prior art compositions or processes, regardless of whether or not they understand their complete makeup or the underlying scientific principles which allow them to operate." *Atlas Powder*, 190 F.3d at 1348; *see also King Pharm.*, 616 F.3d at 1276 (quoting same).

C. Alternative Grounds Support Summary Judgment of Invalidity

Although the district court's grant of summary judgment to Novozymes can be affirmed solely on the ground of anticipation by Veit and Antrim under 35 U.S.C. § 102, there are also at least two alternative grounds on which this Court could affirm the judgment. First, if its arguments regarding the necessity for a "sophisticated recipe" are credited, then U.S. Water has a problem of its own making. All of the asserted claims are invalid under 35 U.S.C. § 112 because the limitation "reducing formation of insoluble deposits of phytic acid and/or salts of phytic acid" lacks adequate written description support and is not enabled. Second, the asserted claims are obvious because the claimed result of reducing phytic acid deposits is, contrary to U.S. Water's unsupported assertion,[16] disclosed in the prior art. Novozymes advanced both of these grounds before the district court, *see* A1524-A1527 and A1542-A1550, and therefore the Court may rely on them as alternative grounds for affirmance. *See Glaxo, Inc. v. TorPharm, Inc.*, 153 F.3d 1366, 1371 (Fed. Cir. 1998).

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[16] U.S. Water asserts that the prior art at issue in this case "admittedly does not disclose the use of phytase for deposit reduction." U.S. Water Br. at 29. No citation is provided to the record for the purported "admission."

1. The "Reducing Formation" Requirement Is Not Adequately Described or Enabled

All of the asserted claims require "reducing the formation of insoluble deposits" of phytic acid and/or phytic acid salts in the fluids of an ethanol processing plant. A141-A142; A150-A152. In contesting the district court's finding of inherent anticipation, U.S. Water argues that "slight variations in the phytase addition process can defeat [a phytase's] ability to reduce phytic acid at all." U.S. Water Br. at 15. On this basis U.S. Water asserts that deposit reduction depends on a correct "recipe" of numerous operational parameters:

> Whether phytase is able to break down substantially all of the twenty or thirty tons or more of phytic acid that flows through the system daily to achieve deposit reduction depends on whether the correct "recipe" is used. This means that, for a particular choice of phytase (different phytases all have different properties), the choice of the amount of phytase, the choice of the addition point, the choice of the residence time, and the choice of parameters such as pH and temperature must be coordinated such that the phytase can accomplish the critical task of converting enough phytic acid to effect a reduction in the formation of deposits. What's more, *each* of these choices can affect whether any given phytase will actually achieve the claimed reduction in the formation of deposits. In other words, one could add enough phytase to accomplish the purpose of Veit or Antrim and *never* see a reduction in the formation of deposits because there would still be too much phytic acid left in solution.

Id. at 16 (internal citations omitted).

While irrelevant to the question of anticipation, if the Court credits U.S. Water's characterization of how its claimed methods actually work, the Court may easily conclude as a matter of law that the invention is neither adequately described in the specification nor enabled. *None* of the considerations U.S. Water describes in its brief are described in the common specification of the asserted patents. The specification nowhere discusses the kinetics of phytic acid fouling, the existence of a "particularly sensitive" trigger for fouling reduction, or the need for a specific "combination of phytase and process conditions." *See id.* at 15. Nor does the specification explain how to coordinate the choice of a particular phytase with "the choice of the amount of phytase, the choice of the addition point, the choice of the residence time, and the choice of parameters such as pH and temperature" in order to successfully accomplish deposit reduction in a fuel ethanol plant. In fact, as to the specific parameter of pH—one of the allegedly critical ingredients of the "recipe"—U.S. Water has previously admitted that the specification of the priority application, and thus of the asserted patents, does not describe using a pH of "4.5 or higher" in the beer column because U.S. Water instead opted to protect its use of this parameter as a trade secret. *See infra* § VI.D. Similarly, while U.S. Water contends that Antrim's teaching of "adding phytase to liquefaction" does not reduce deposit formation, U.S. Water Br. at 21-22, the asserted claims (by U.S. Water's account) encompass adding phytase in liquefaction, and the specification provides no guidance that such addition would be ineffective.

Indeed, the inventors could not have described or enabled "the right combination of phytase and process conditions" because, as of the priority date, they did not know what U.S. Water now asserts is the "sophisticated recipe" required to reduce the formation of deposits. Dr. Young testified in his deposition that as of the 2007 priority date, his "discovery" had not been tested at a fuel ethanol plant,[17] and he assumed that so long as phytic acid content is reduced by some amount, deposit formation would also be reduced, i.e., that he assumed the exact *opposite* of what U.S. Water now argues.

> Q. In your patent application you don't have any examples that actually show the decrease in the formation of deposits; do you?
>
> A. The application was filed before we took it to the field.
>
> Q. So the answer to my question is correct?
>
> [question read back]
>
> A: That is correct.
>
> Q. So you were making the assumption that if phytic acid content was reduced, then you would reduce the formation of deposits; correct?
>
> [objection as to form]
>
> Q. When you filled [*sic*] this patent application in October 2007?
>
> A. That is a logical presumption on my part that we would see that.

A406 (164:21-165:21). The inventors could not have described or enabled what they did not know. *See Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916,

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[17] U.S. Water criticizes Veit and Antrim for relying on laboratory or "benchtop" experiments, rather than experiments performed in a fuel ethanol plant. U.S. Water Br. at 17-18, 20-21. But of course the same is true of the specification of the asserted patents, and pursuant to *King*, the prior art need not disclose more.

929 n.9 (Fed. Cir. 2004) ("[O]ne cannot describe what one has not conceived." (quoting *Fiers v. Revel*, 984 F.2d 1164, 1171 (Fed. Cir. 1993))); *ALZA Corp. v. Andrx Pharm., LLC*, 603 F.3d 935, 941 (Fed. Cir. 2010) (patentee "was required to provide an adequate enabling disclosure in the specification").

Thus, if the Court credits U.S. Water's assertion that a fuel ethanol plant can only achieve deposit reduction with the "right combination of phytase and process conditions," then it should find the asserted claims invalid under 35 U.S.C. § 112 for lack of adequate written description and enablement. *See MagSil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1380-81 (Fed. Cir. 2012); *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). By arguing that deposit reduction in a fuel ethanol plant requires a special "recipe" of phytase and process conditions, U.S. Water has submarined its own patents. In the end, this is a classic case of the patentee having "a problem of its own making." *See Promega Corp. v. Life Techs. Corp.*, 773 F.3d 1338, 1349 (Fed. Cir. 2014) (finding claims not enabled in light of patentee's "own statements"). The asserted patents do not adequately describe or enable the purported invention.

2. The Asserted Claims Are Obvious Under 35 U.S.C. § 103

U.S. Water does not challenge the district court's finding that all of the steps of its claimed methods, save the result, are expressly disclosed in Veit and Antrim. Even if not inherent in Veit and Antrim, the result of reducing phytic acid deposits is expressly disclosed in another prior art reference, and the asserted claims are therefore obvious. *See* 35 U.S.C. § 103(a); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-18 (2007). This Court may affirm summary judgment on this alternative ground.

More than seventeen years before the filing of U.S. Water's priority application, Caransa taught the use of phytase to degrade phytic acid and phytic acid salts in order to reduce deposit formation in a wet milling process. *See generally* A3114-A3119. Wet milling and dry milling are two methods used to initially process the grain used to produce fuel ethanol, after which the fuel ethanol production process is the same. A3044 ¶ 24; A1030-A1032 ¶¶ 412-15; A1614 at 1:27-2:29; U.S. Water Br. at 5-7. In wet milling, corn grain is steeped in water and then separated into starch, germ, fiber, protein, and corn steep liquor ("CSL"), a portion of which is added to the processing fluid as a nutrient for yeast in fermentation; in dry milling, the entire corn kernel is ground up and mixed in water. A3115 at 1:11-30; A1030-A1031 ¶¶ 412, 414; A3044-A3045 ¶¶ 25-26; A771-A772 ¶ 23.

Caransa describes eliminating or reducing the levels of phytic acid and phytic acid salts during CSL production in wet milling ethanol processing:

> Corn or sorghum kernels are steeped in warm water containing sulfur dioxide in the presence of an enzyme preparation including one or more phytin-degrading enzymes, such as phytase and acid

> phosphatases, to eliminate or greatly reduce phytic acid and the salts of phytic acid.

A3114. Caransa teaches that phytic acid "forms an undesirable component"—a "sludge" or "precipitate coating"—in the steepwater evaporator in which CSL is produced and in the fermenter when CSL is used as a nutrient for fermentation. A3115 at 1:31-51. As a solution, Caransa teaches that the steeping process should be performed "in the presence of an enzyme preparation comprising one or more phytin-degrading enzymes," such as phytase. *Id*. at 2:20-45.

Dr. Young admitted during his deposition that the claimed methods of the asserted patents encompass both wet milling and dry milling ethanol production processes. A397 (126:19-127:8). Similarly, Dr. Young stated in a declaration submitted during prosecution of both the '244 and '137 patents that his invention "is not limited to wet milling"—an express acknowledgement that the invention *includes* the addition of phytase in wet milling ethanol production processes. A2319 ¶ 5; A2551 ¶ 5; *see also* A1614 at 1:27-2:29; A1617 at 8:38-41. Likewise, Veit and Antrim contemplate that the methods each describes may be applied in both wet milling and dry milling ethanol production. A1583:37-A1584:4; A1614 at 1:14-16, 1:27-2:29.

Given these undisputed facts, a person of ordinary skill in the art would be motivated to combine the teachings of Caransa with Veit or Antrim to add phytase *directly* to processing fluid in order to prevent phytic acid fouling wherever it might occur in fuel ethanol production equipment. Such a combination is no more than the application of a known technique (addition of phytase) previously used to improve the initial stage (wet milling) of the fuel ethanol production process to improve later stages (fermentation and ethanol extraction) of that same process in the same way (reduced formation of phytic acid deposits). *See KSR*, 550 U.S. at 415-18; *see also, e.g.*, *Ecolab, Inc. v. FMC Corp.*, 569 F.3d 1335, 1349-50 (Fed. Cir. 2009) (finding method claims for treating meat with the antimicrobial compound PAA under specified conditions obvious because one prior art reference disclosed PAA-treatment of meat under all specified conditions except use of a high-pressure spray, a second prior art reference "disclosed using high pressure to improve the effectiveness of an antimicrobial solution when sprayed onto meat, and . . . an ordinarily skilled artisan would have recognized the reasons for applying PAA using high pressure and would have known how to do so"), *amended on reh'g in unrelated part by* 366 F. App'x 154 (Fed. Cir. 2009). And given that phytase had already been successfully used by Veit and Antrim for other purposes in fuel ethanol production, a person of ordinary skill in the art would have had a reasonable expectation of success when combining either reference with Caransa.

U.S. Water relied heavily on various secondary considerations in opposing Novozymes' motion for summary judgment of obviousness below. But secondary considerations, whatever they are, cannot overcome a strong showing of obviousness based on U.S. Water's own admissions about the prior art. *See Dow Chem. Co. v. Halliburton Oil Well Cementing Co.*, 324 U.S. 320, 330 (1945) (secondary considerations are relevant only in "a close case where all other proof leaves the question of invention in doubt").

D. The District Court Erred in Granting Summary Judgment of No Inequitable Conduct

The inventors, their prosecuting attorney, and U.S. Water's CEO knew U.S. Water was not entitled to claim patent protection for the methods of reducing deposits in the '137 and '399 patents, but withheld information from the Patent Office that, had it been disclosed would have prevented both patents from issuing. The district court erred in granting U.S. Water's motion for summary judgment that the asserted patents are unenforceable due to inequitable conduct.

The summary judgment record must be considered as a whole, and further must be viewed in the light most favorable to Novozymes as the non-moving party, with all reasonable inferences drawn in Novozymes' favor. *See Reeves v. Sanderson Plumbing Prods., Inc.*, 530 U.S. 133, 150 (2000) ("the court must review the record 'taken as a whole'" (quoting *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 587 (1986))); *accord Spierer v. Rossman*, 798 F.3d 502, 510 (7th Cir. 2015) (summary judgment appropriate "[w]here the record taken as a whole could not lead a rational trier of fact to find for the nonmoving party" (quoting *Matsushita*, 475 U.S. at 587)); *see also supra* § VI.A. From that correct perspective, the evidence before the district court shows that U.S. Water realized that the '244 patent had no value, and withheld material information with the specific intent of deceiving the Patent Office in order to obtain broader claims that it could assert against competitors. On this record, the question of inequitable conduct could not be decided *as a matter of law* against Novozymes.

1. Novozymes Identified Genuine Issues of Material Fact that Preclude Summary Judgment of No Inequitable Conduct

To ultimately prevail on a claim of inequitable conduct, Novozymes must prove by clear and convincing evidence that during prosecution of the asserted patents the applicants, assignees, and/or their patent attorney: (1) misrepresented or omitted material information; and (2) did so with the specific intent to deceive the Patent Office. *Therasense, Inc. v. Becton, Dickinson & Co.*, 649 F.3d 1276, 1290 (Fed. Cir. 2011) (en banc). Materiality and intent are separate requirements. *Id.* The standard of materiality required to establish inequitable conduct is that the Patent Office would not have granted the patents but-for the applicant's failure to disclose relevant materials. *Id.* at 1291. Intent to commit inequitable conduct may be inferred from indirect and circumstantial evidence, but only if the inference of intent to deceive the Patent Office is "the single most reasonable inference able to be drawn from the evidence." *Id.* at 1290 (quotation omitted).

Novozymes alleged inequitable conduct based on U.S. Water's failure to disclose to the Patent Office materials from the *ChemTreat* litigation. A550 ¶ 10. Specifically, in prosecuting the priority application that later issued as the '244 patent, U.S. Water overcame the examiner's rejections over Veit and Caransa by explicitly relying on the *location* of phytase addition to the fuel ethanol production process, i.e., *after* fermentation. A2228-A2229 (arguing that Veit "does not disclose or suggest that any advantage might be achieved to adding phytase to process waters (e.g., thin stillage or backset) that are produced by fermentation such that phytase is added after fermentation"); A2314-A2315 (distinguishing Caransa on the basis that "[a] reference that does not mention thin stillage or backset can not [*sic*] – alone or in combination with another reference – disclose or suggest adding phytase to thin stillage o[r] backset"). U.S. Water even amended its pending claims, which originally specified adding phytase "after fermentation," to further limit addition of phytase to particular post-fermentation processing fluids, namely "thin stillage, backset, or mixture thereof." A2222-A2225. The real-world ramifications of this disclaimer, however, only became apparent to U.S. Water when ChemTreat sought summary judgment of non-infringement based on its instructions to add phytase during fermentation or prior to fermentation, but not, as claimed by U.S. Water, after fermentation. A2906. U.S. Water then pursued strategies in the district court and in the Patent Office to broaden the scope of its patent claims.

First, in the *ChemTreat* litigation itself, U.S. Water attempted to salvage its patent infringement counterclaim by arguing the doctrine of equivalents. In opposing ChemTreat's summary judgment motion, U.S. Water contended that adding phytase *during* fermentation should be considered the equivalent of adding phytase *after* fermentation. According to U.S. Water, that is so because "phytase is added to backset," a post-fermentation fluid, "and the backset (containing phytase) is circulated back into fermentation." A2941; *see also* A2927-A2928. In other words, U.S. Water's litigation position was that adding phytase to backset after fermentation results also in adding recycled phytase-containing backset during fermentation, and is therefore equivalent to adding phytase during fermentation. The district court in the *ChemTreat* litigation confronted U.S. Water about its contradictory prosecution and litigation positions, and granted ChemTreat's motion for summary judgment of non-infringement, finding that "the ['244] patent is clear that it covers only methods that involve adding phytase after fermentation." A3000.

Second, with respect to its patent strategy, U.S. Water attempted to persuade the Patent Office to issue continuation patents with broader claims in which the location of phytase addition was not limited in any way. *Compare* A2474-A2476 *with* A2541-A2544; *see also* A2709-A2714. These broader claims would restore to U.S. Water the offensive patent position it had previously hoped to leverage against competitors such as ChemTreat and now Novozymes. But U.S. Water was only able to accomplish that restoration by withholding from the Patent Office its repudiation in the *ChemTreat* litigation of its prior representation distinguishing Veit and Caransa on the basis of where phytase is added. The Patent Office never saw U.S. Water's opposition briefing, or Attorney Skoog's declaration and deposition transcript, or the summary judgment hearing transcript, or the district court's order granting summary judgment. Neither Mr. Johnson nor Mr. Bly nor Attorney Skoog nor anyone else associated with the prosecution of the asserted patents ever disclosed these *ChemTreat* litigation materials, or indeed the existence of the *ChemTreat* litigation, to the Patent Office.

U.S. Water compounded its omission by claiming in its continuation applications, now issued as the '137 and '399 patents, subject matter that it had previously admitted during the *ChemTreat* litigation was a trade secret not disclosed in the priority application. During the *ChemTreat* litigation, U.S. Water identified "reduction in acid feed resulting from use" of phytase for deposit reduction as one of its trade secrets, and Mr. Johnson submitted a declaration explaining that reduced acid feed "is not taught nor mentioned in the ['244] patent filing." A4794; A3015 ¶ 13. This admission was not disclosed to the Patent Office.

Not only did U.S. Water fail to inform the Patent Office that "reducing acid feed" and allowing the pH to be 4.5 or higher was a trade secret, but it also failed to disclose to the Patent Office that this trade secret subject matter was not even conceived as of the priority date. A3028; A3031-A3033. Mr. Johnson and Dr. Young did not identify reduced acid use as a benefit of using phytase until March of 2008, five months *after* the priority application was filed. [redacted] A3029. [redacted] *Id.* [redacted]

[redacted]

[redacted]

[redacted]

A3028. [redacted] A3031-A3033.

Mr. Johnson, testifying as a corporate representative of U.S. Water, confirmed at his June 4, 2015 deposition following briefing on summary judgment that U.S. Water had maintained the concept of "reducing acid feed" as a trade secret, and did not disclose it in the priority application. He conceded, however, that *claims* to this concept had been added in the continuation applications that issued as the '137 and '399 patents.[18] A4638 (138:3-21); A4790 ¶ 515.

In considering U.S. Water's motion for summary judgment of no inequitable conduct, the district court applied the wrong standard to this record. The court concluded that "Novozymes falls short of establishing the but-for materiality of the *ChemTreat* information in the prosecution of the patents-in-suit" and "also falls

[18] Novozymes first raised the trade secrets aspect of its inequitable conduct allegations in its initial summary judgment briefing, A4205 n.10, but was not then able to fully brief the issue because key evidence had not yet been produced. When additional evidence was later obtained, Novozymes submitted it to the district court in connection with its supplemental summary judgment briefing on written description, subject to leave of court. A4763-A4785. The district court permitted U.S. Water an opportunity to respond to the evidence, but did not decide Novozymes' motion for leave in advance of the order from which Novozymes now cross-appeals. A103 (Dkt. No. 337).

short of showing deceptive intent." A34-A35. In other words, the district court required Novozymes to prove its case. But at the summary judgment stage, Novozymes' burden as the *non-movant* is not to prove it is entitled to judgment in its own favor, but rather to show the existence of a genuine issue of material fact as to the materiality and intent prongs of the inequitable conduct inquiry, when the record is viewed as a whole in the light most favorable to Novozymes. *See supra* § VI.A. Because Novozymes made that showing, the district court should have denied U.S. Water's motion for summary judgment.

2. Materiality

There is at least a genuine issue of fact that the *ChemTreat* litigation documents withheld by U.S. Water from the Patent Office are material. The Patent Office itself requires that applicants disclose the existence of litigation involving "subject matter for which a patent is being sought." Manual of Patent Examining Procedure § 2001.06(c) (9th ed. March 2014). This Court has held in similar circumstances that failure to disclose such litigations is material. *See, e.g.*, *Leviton*, 606 F.3d at 1362 (affirming materiality of patentee's failure to disclose litigation involving parent patents during prosecution of continuing application, even though validity of those patents was upheld); *see also Nilssen v. Osram Sylvania, Inc.*, 504 F.3d 1223, 1234 (Fed. Cir. 2007) (affirming finding that inventor committed inequitable conduct by not disclosing related litigation to the Patent Office).

Here, had the examiner been aware of the statements and admissions made by the inventors, the prosecuting attorney, and others associated with prosecution of the asserted patents, there is at least a question on whether the asserted patents would have issued. U.S. Water's litigation position regarding the equivalence of phytase addition during and after fermentation renders at least Veit and Caransa invalidating prior art. *See Lewmar Marine, Inc. v. Barient, Inc.*, 827 F.2d 744, 747 (Fed. Cir. 1987) ("That which would literally infringe if later in time anticipates if earlier."). In addition, U.S. Water's admission in the *ChemTreat* litigation that reduced acid feed is a trade secret not disclosed in the specification of the parent '244 patent (i.e., the priority application) would have foreclosed allowance of any claims including such a limitation. *See Atl. Research Mktg. Sys., Inc. v. Troy*, 659 F.3d 1345, 1356 (Fed. Cir. 2011) (holding that a patentee cannot "'have it both ways' by reaching back and relying on the disclosures in the [asserted] patent to claim an invention he was purposely shielding from the public [as a trade secret]"); *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1365 (Fed. Cir. 2011) (affirming grant of summary judgment under section 112 for failure to disclose best mode where the patentee intentionally withheld identity of additive from specification in order to maintain trade secret protection); *see also Anascape, Ltd. v. Nintendo of Am., Inc.*, 601 F.3d 1333, 1335 (Fed. Cir. 2010) ("To obtain the benefit of the filing date of a parent application, the claims of the later-filed application must be supported by the written description in the parent . . . ."); *Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1379 (Fed. Cir. 2009) ("The written description doctrine prohibits new matter from entering into claim amendments, particularly during the continuation process.").

Thus, even if, as the district court proposes, the examiner was aware that U.S. Water was attempting to broaden its claims by removing the after-fermentation limitation and that the broader claims had to be analyzed in light of Veit and Caransa, the examiner was not apprised that U.S. Water's statements during the *ChemTreat* litigation contradicted its representations to the Patent Office and bore directly on the effort to broaden these claims. Under these circumstances, it is not reasonable to expect that the examiner fully appreciated the significance of U.S. Water's amendments. *Cf. Hakim v. Cannon Avent Grp.*, 479 F.3d 1313, 1317-18 (Fed. Cir. 2007) ("Although a disclaimer made during prosecution can be rescinded, permitting recapture of the disclaimed scope, the prosecution history must be sufficiently clear to inform the examiner that the previous disclaimer, and the prior art that it was made to avoid, may need to be re-visited."). The record establishes at least a genuine issue of material fact regarding the materiality of the information withheld from the *ChemTreat* litigation.

3. Intent to Deceive

The single most reasonable inference that can be drawn from the record is that at least the named inventors, their prosecuting attorney, and U.S. Water's CEO Mr. Bly acted with intent to deceive the Patent Office. ChemTreat revealed the weakness of the '244 patent claims when it filed its motion for summary judgment of non-infringement on July 2, 2012. Before the end of that same month, U.S. Water, Attorney Skoog, and Mr. Johnson made representations to the district court in the *ChemTreat* litigation that contradicted the representations the inventors and their attorney had previously made to the Patent Office. They submitted claim amendments that claimed subject matter that they had previously described as trade secrets that were not disclosed in the priority application. Neither the inventors, Mr. Bly, nor Attorney Skoog submitted any *ChemTreat* litigation materials to the Patent Office, even though the Patent Office's own regulations required their submission.

No reasonable inference can be drawn from this evidence other than that Messrs. Young, Johnson, Bly, and Skoog knew that the examiner would not allow the claims now being asserted against Novozymes had those materials been disclosed. And certainly at a minimum, the evidence, viewed in the light most favorable to Novozymes, raises issues of fact regarding intent that renders disposition on summary judgment inappropriate. *See Am. Calcar, Inc. v. Am.*

Honda Motor Co., 768 F.3d 1185, 1191 (Fed. Cir. 2014) (upholding finding of inequitable conduct based in part on witness's lack of credibility); *Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1335 (Fed. Cir. 2012) (same).

Supplemental evidence obtained by Novozymes following the completion of summary judgment briefing supports the conclusion that an intent to deceive should be inferred. A4763-A4792. This evidence, which Novozymes sought leave to submit in support of its prior briefing, *see supra* 62 n.18, confirms at least that Mr. Johnson and Mr. Bly knew that U.S. Water was attempting to obtain patent protection for subject matter that the company had maintained as a trade secret and that was not disclosed in the priority application. During his June 4, 2015 deposition, Mr. Johnson testified:

> As we mentioned in this trade secrets action, we did not reveal that acid reduction was one of the benefits of using the product at that point in time. It was a trade secret at that time. Now, the supplemental filings using the same specification, which clearly states that you can operate at a pH of about four-and-a-half, allows you to reduce acid.

A4638 (138:12-21). Mr. Bly similarly testified in an April 8, 2015 deposition that U.S. Water claimed concepts that were previously considered trade secrets in its continuation patent applications:

> Q: And are these trade secrets that we've just referred to in the second amended complaint we've marked as Exhibit 1242, are those still trade secrets of your company?

> A: For the most part I think most of those would have [to] be trade secrets. There may have been some of them that have been subsequently put in to the additional patent filings. . . . But as far as I know they're still trade secrets to the prospective unless they have been added and put in to the additional patent filings that we've done.
>
> Q: So they haven't been disclosed publicly by your company otherwise?
>
> A: Well, this was in 2009?
>
> Q: 2011.
>
> A: 2011. I mean since that time we filed some additional—for some additional patents. Some of th[ese] particular trade secrets we may have decided or may have required us to be put into the patent applications and at that point they wouldn't be trade secrets anymore.

A4701-A4702 (217:13-218:13). These admissions, if not dispositive of the question of intent, certainly would preclude a finding of no intent as a matter of law.

For these reasons, the district court's order granting U.S. Water's motion for summary judgment that inequitable conduct does not render the asserted patents unenforceable should be reversed, as there are genuine issues of material fact precluding judgment as a matter of law on the issue.

VII. CONCLUSION AND STATEMENT OF RELIEF SOUGHT

For the foregoing reasons, the district court's order granting summary judgment to Novozymes on the issue of invalidity should be affirmed. The district court's order granting summary judgment of no inequitable conduct should be reversed and the case remanded for further proceedings on that issue.

Dated: December 17, 2015

Respectfully submitted,

FENWICK & WEST LLP
1191 Second Avenue, 10th Floor
Seattle, WA 98101
dtellekson@fenwick.com
Telephone: 206-389-4510
Facsimile: 206-389-4511

By: s/*David K. Tellekson*
David K. Tellekson

Attorneys for Defendants - Cross-Appellants

CERTIFICATE OF SERVICE

I, David K. Tellekson, hereby certify that on December 17, 2015, I caused the foregoing **NONCONFIDENTIAL PRINCIPAL AND RESPONSE BRIEF OF DEFENDANTS - CROSS-APPELLANTS NOVOZYMES A/S AND NOVOZYMES NORTH AMERICA, INC.** to be served on the following parties as indicated below:

John S. Skilton **David J. Harth** **Michelle M. Umberger** **Autumn N. Nero** PERKINS COIE LLP One East Main Street, Suite 201 Madison, WI 53703 **Colin G. Sandercock** PERKINS COIE LLP 700 Thirteenth Street N.W. Washington, DC 20005 *Attorneys for Plaintiffs-Appellants U.S. Water Services, Inc. and Roy Johnson*	[ ] By United States Mail [ ] By Legal Messenger **[X] By Electronic CM/ECF** [ ] By Overnight Express Mail [ ] By Facsimile **[X] By Email [courtesy copy]** jskilton@perkinscoie.com dharth@perkinscoie.com mumberger@perkinscoie.com anero@perkinscoie.com csandercock@perkinscoie.com

Dated: December 17, 2015

By: *s/David K. Tellekson*
David K. Tellekson
FENWICK & WEST LLP

Attorneys for Defendants - Cross-Appellants NOVOZYMES A/S and NOVOZYMES NORTH AMERICA, INC.

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS

1. This brief of Defendants - Cross-Appellants complies with the type-volume limitation of Federal Rule of Appellate Procedure 28.1(e)(2). The brief contains 16,410 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii) and Federal Circuit Rule 32(b).

2. The brief complies with the typeface requirements of Federal Rule of Appellate Procedure 28.1(e)(2) and the type style requirements of Federal Rule of Civil Procedure 32(a)(6). The brief has been prepared in a proportionally spaced typeface using Microsoft Office Word Version 2010 in 14-point Times New Roman.

Dated: December 17, 2015

FENWICK & WEST LLP
1191 Second Avenue, 10th Floor
Seattle, WA 98101
dtellekson@fenwick.com
Telephone: 206-389-4510
Facsimile: 206-389-4511

By: *s/David K. Tellekson*
David K. Tellekson

Attorneys for Defendants - Cross-Appellants